What is claimed is:

1. A macromer which is capable of forming a gel, the macromer comprising at least four covalently linked polymeric blocks, wherein

a) at least one block is hydrophilic

b) each hydrophilic block individually has a water solubility of at least 1 gram/liter; and

c) at least two blocks are sufficiently hydrophobic to aggregate to form micelles in an aqueous continuous phase;

wherein the macromer further comprises at least one crosslinkable group.

2. The macromer of claim 1 wherein the crosslinkable groups are separated by at least one degradable linkage capable of degrading under physiological conditions.

3. The macromer of claims 1 wherein at least one hydrophobic block is separated from any crosslinkable group by at least one hydrophilic block.

4. The macromer of any of claim 1 comprising five total blocks.

5. The macromer of claim 1 comprising at least two chemically distinct hydrophobic blocks.

6. A solution of a macromer of claim 1, further comprising a biologically active material.

7. The macromer of claim 1 wherein the macromer comprises at least one thermally sensitive region, and wherein a solution of the

macromer is capable of gelling or crosslinking to produce a hydrogel with a temperature dependent volume.

8. The macromer of claim 7 wherein the rate of release of a drug incorporated in the hydrogel is dependent upon the volume of the hydrogel.

9. The macromer of claim 1 wherein the macromer is capable of thermoreversible gelation in an aqueous solution of the macromer at a concentration of at least 2% by weight, and wherein the gelation temperature is between about 0°C and about 65°C.

10. The macromer of claim 1 wherein the macromer has an optically anisotropic phase at a concentration at or below the maximal solubility of the macromer in an aqueous solution, at a temperature between about 0 and 65°C.

11. The macromer of claim 1, further comprising at least one ionically charged moiety covalently attached to the macromer.

12. The macromer of claim 1 wherein the macromer has a phase transition temperature in the range of 0 to 100°C, and wherein the transition temperature is affected by a property selected from the group consisting of the ionic composition of an aqueous solution of the macromer and the concentration of macromer in the aqueous solution.

13. A mixture comprising the macromer of claim 1 and a hydrophobic material non-covalently associated with the macromer.

14. The mixture of claim 13, wherein the hydrophobic material is selected from the group consisting of a hydrocarbon, a lipid, a fatty acid, and a sterol.

15. The macromer of claim 1 wherein the crosslinkable group is selected from the group consisting of an ethylenically unsaturated group, an epoxide, an isocyanate, an isothiocyanate, an aldehyde, an amine, a sulfonic acid and a carboxylic acid.

16. The macromer of claim 1 wherein the hydrophobic blocks are the same or different and are selected from the group consisting of polypropylene oxide, polybutylene oxide, hydrophobic mixed poly(alkylene oxides), and oligomers of hydroxy acids, lactones, amino acids, anhydrides, orthoesters, phosphazenes, and phosphates.

17. The macromer of claim 1 wherein the hydrophilic blocks are the same or different and are selected from the group consisting of poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(vinylpyrrolidone), poly(ethyloxazoline), polysaccharides and amino acid polymers.

18. The macromer of claim 2 wherein the degradable linkage groups are the same or different and are selected from the group consisting of poly(alpha-hydroxy acids), poly(amino acids), poly(anhydrides), poly(orthoesters), poly(phosphazines), poly(phosphoesters), and polylactones.

19. The macromer of claim 1 wherein at least two hydrophobic blocks are separated by a hydrophilic block.

20. The macromer of claim 1 wherein each hydrophobic block is separated by a hydrophilic block from any other hydrophobic block.

21. The macromer of claim 1 wherein the dry macromer absorbs at least about 10% in weight of water.

22. The macromer of claim 1 wherein the molecular weight of the macromer is at least 1000 Daltons.

23. The macromer of claim 1 wherein the molecular weight of the macromer is at least 2000 Daltons.

24. The macromer of claim 1 wherein the molecular weight of the macromer is at least 4000 Daltons.

25. A gel formed from an aqueous solution of the macromer of claim 1 or mixtures thereof, wherein the crosslinkable groups are covalently crosslinked.

26. The gel of claim 25 further comprising a biologically active material.

27. The gel of claim 26 wherein the biologically active material is provided in a form selected from the group consisting of particles, microparticles, pro-drug conjugates, or liposomes.

28. The gel of claim 25 wherein the gel changes in permeability in response to one or more effects selected from the group consisting of changes in temperature, pH, ionic strength, and ionic composition.

29. The gel of claim 25 wherein the gel is formed on a surface of biological tissue.

30. The gel of claim 25 wherein the gel is formed on a surface of a medical device.

31. The gel of claim 25 wherein the gel is formed between opposed surfaces, tending thereby to adhere said surfaces.

32. A method of treating a medical condition, comprising applying to tissue *in vivo* an aqueous solution of a gel-forming macromer, comprising at least four covalently-linked polymeric blocks, wherein

a) at least one blocks is hydrophilic;

b) each hydrophilic block individually has a water solubility of at least 1 gram/liter; and

c) at least two blocks are sufficiently hydrophobic to aggregate to form micelles in an aqueous continuous phase; and

wherein the macromer further comprises at least one crosslinkable group.

33. The method of claim 32 wherein the aqueous solution comprises a solution or suspension of a biologically active material.

34. The method of claim 33 wherein the medical condition is a burn or abrasion of the skin.

35. The method of claim 33 wherein the medical condition is a tissue disturbed by a surgical intervention.

36. The method of claim 35 wherein the surgery is angioplasty.

37. The method of claim 35 wherein the surgery is conducted through the cannula of a trocar.

38. A method for controlling the rate of delivery of a biologically active material, comprising mixing the active material with a solution of a gel-forming macromer and covalently crosslinking said macromer to form a gel, wherein the macromer comprises at least four blocks and at least one covalently crosslinkable group, and wherein at least two the blocks are hydrophobic, and at least two of the blocks are hydrophilic.

39. The method of claim 38 wherein the crosslinked gel changes in permeability in response to an effect selected from the group consisting of a change in temperature, a change in ionic concentration, and a change in pH.

40. The method of claim 38 wherein at least one hydrophobic block aggregates in aqueous solution to form a hydrophobic domain.

41. The method of claim 40 wherein the hydrophobicity of said domain is controlled by selecting the hydrophobicity of the block.

42. The method of claim 40 wherein the hydrophobicity of said domain is controlled by adding hydrophobic materials to the gel-forming macromer solution.

43. The method of claim 38 wherein the active material is in the form of a microparticle.

44. The method of claim 38 wherein the gel forms a microparticle after crosslinking.

45. The macromer of claim 1 further comprising at least two hydrophilic blocks.

46. The macromer of claim 1 provided in a pharmaceutically acceptable carrier.

47. The macromer of claim 46 wherein the macromer is provided in a carrier suitable for parenteral administration.

48. The method of claim 32 wherein the macromer further comprises at least two hydrophilic blocks.

49. The method of claim 32 wherein the macromer is applied to tissue in a pharmaceutically acceptable carrier.

50. The method of claim 49 wherein the macromer is provided in a pharmaceutically acceptable carrier for parenteral administration.